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PROCEEDINGS

OF THE

AMERICAN ACADEMY

OF

ARTS AND SCIENCES.

SELECTED FROM THE RECORDS.

VOL. V.

Four hundred and eighty-fourth meeting.

May 29, 1860. — ANNUAL MEETING.

The PRESIDENT in the chair.

The Corresponding Secretary read letters acknowledging the reception of the Academy's publications; also from the Entomological Society of Stettin, and the Royal University of Christiana, Norway, accompanying donations to the library. Also, a letter from Theodore Lyman, Esq., Fellow of the Academy, presenting a copy of the *Histoire et Mémoires de l'Académie des Inscriptions*, Vols. 1 to 50, inclusive, and Index, and fourteen volumes of the *Mémoires de l'Institût*, complete to the year 1818.

The thanks of the Academy were voted to Mr. Lyman for his valuable donation.

The Treasurer presented his annual report upon the finances of the Academy; which was ordered to be entered in full upon the record-book.

Professor Rogers reported, from the Committee on the Library, that 236 volumes and 416 parts of volumes have been added to the library by gift during the past year, and 213 volumes and 268 pamphlets by purchase. Also, that 723 volumes have been borrowed from the library during the year.

Professor Lovering read the report of the Committee on Publication, detailing its operations during the past year.

In behalf of the Council, Professor Gray, its secretary, read the following report upon the changes which have occurred in the *personelle* of the Academy since the preceding annual meeting: —

Since the last annual meeting, the Academy has elected six Resident Fellows, three Associate Fellows, and two Foreign Honorary Members.

Three of the newly chosen Fellows belong to the First Class; one to the Second; and two to the Third Class.

Of the Associate Fellows, one was chosen into each Class.

Of the Foreign Honorary Members, one, M. LIOUVILLE of Paris, belongs to the First Class, Section 1: the other, Professor VALENTIN, to the Second Class, Section 3.

These accessions exactly equal the number of vacancies which have been caused by death during the past year.

Within this period, five Resident Fellows have deceased; viz. HON. THOMAS G. CARY, HON. RUFUS CHOATE, REV. DR. WILLARD, MR. BENJAMIN A. GOULD, MR. WILLIAM WELLS, — all of Class III.

We have lost three Associate Fellows; viz. THOMAS NUTTALL, of the Second Class; HORACE MANN, and WASHINGTON IRVING, of the Third Class.

Also, three Foreign Honorary Members; viz. ROBERT STEPHENSON, of Class I.; KARL RITTER, of Class II.; and FREDERICK WILLIAM THIERSCH, of Class III.

The anniversary meeting offers a fitting occasion for some tribute, however cursory, to the memory of the Associates whose death we have to deplore. For important assistance in the preparation of these obituary remarks, the Council offer their acknowledgments and thanks to several Fellows, who kindly responded to their call, and of whose help they would gladly have availed themselves more largely. But our statements upon the present occasion must needs be brief and general.

Indeed, two of our late Associates, CHOATE and IRVING, were men whose mark and fame render all comment, which could be offered here and now, superfluous. Prompt and fitting public eulogies have already been elsewhere pronounced over the remains of the most eloquent advocate of our time; and, still more recently, over those of the popular author, who down to the close of a long and most honorable life continued to adorn, by important works, that American literature to the formation and general recognition of which he had, even in early years, contributed more than any other writer.

The earliest loss from our immediate ranks was that of the HON. THOMAS GRAVES CARY, which followed within a month our last anniversary. Mr. Cary was born at Chelsea in 1791; was graduated at Harvard College in 1811, and admitted to the Suffolk bar in 1814. After a residence of several years in Brattleborough, Vermont, in the practice of his profession, and afterwards in New York, where he engaged in commerce, he returned to Boston, where he passed the rest of his useful and honorable life in various business pursuits, and in the occupation of many important trusts. He died on the 3d of July last. Mr. Cary was a man of refined literary taste, a lover of art, and a careful student of moral, political, and economical science. His numerous published articles, lectures, and reviews upon these subjects, and his more elaborate Memoir of Thomas Handasyd Perkins, show him to have been a vigorous writer and speaker, in a pure and idiomatic style. His sterling integrity and good sense, and unaffected dignified manners, his active interest in educational and social questions, and his efficient administration as President for many years of the Boston Athenæum, and in other responsible trusts, are well remembered by his associates in this and in other institutions.

REV. SAMUEL WILLARD, D. D., was born at Petersham, Mass., on the 19th of April, 1776, was graduated at Harvard College in 1803, became Assistant Preceptor in Exeter Academy in 1804, and a Tutor in Bowdoin College the following year. He was ordained over the Unitarian Church in Deerfield, Mass., in 1807, elected a Fellow of the Academy in 1816, resigned his pastoral charge on account of loss of sight in the autumn of 1829, and died at Deerfield on the 8th of October, 1859. These few data indicate all the principal epochs of an uneventful, but a valuable and useful life. They suggest no title to celebrity; but they present a modest and valid claim to that respect which justly attaches to intelligence, virtue, and piety, and to a faithful and exemplary devotion to his sacred calling. His publications were few; but they are creditable to his learning, good sense, and Christian temper. Among them is a collection of hymns, many of which were of his own composing, and prepared with reference to an original theory, which is elaborately explained in the Preface. During the thirty years of his total blindness, his memory, which was naturally good, was cultivated, as is not unusual in such cases, to great quickness and accuracy. Besides retaining with literal exactness nearly the whole of the New Testament, he is said to have solved all the problems of Euclid, orally, by recalling the images of the diagrams with which he had been familiar in his youth.

Our late respected colleague, BENJAMIN APTHORP GOULD, also died in October last. Mr. Gould was born in Lancaster, Mass., in 1787, and graduated at Harvard College in 1814. In early life he struggled against many disadvantages, having only the opportunities of a common country school, and not having even the command of his own time until he became of age. He then supported himself by teaching for some years, a profession in which he exhibited peculiar aptitude and acquired a marked reputation. Being intent on a collegiate education, he prepared himself, somewhat late in life, for admission into College, almost without assistance, and afterwards took his place in the foremost rank of a class distinguished by the presence of some of our brightest luminaries in literature. In the latter part of his Senior year, a vacancy occurred in the Public Latin School in Boston, and Mr. Gould, though yet an undergraduate, received, in consequence of the character he had acquired and the strong recommendations of President Kirkland and others, the appointment of master in that institution. How well he discharged the duties of that office the testimony of his numerous pupils, and the acknowledged elevation of the character of the seminary itself, afford ample proof. In 1828, Mr. Gould resigned his post as Principal of the Latin School, and devoted the remainder of his life to commerce. For many years he sustained the reputation of an honorable, intelligent, and successful merchant; and has died in the maturity of life, leaving many who recollect with pleasure his generous nature, his conscientious rectitude, and his unwavering fidelity in the path of duty.

Even within the past month, viz. on the 21st of April, the Academy lost another, and one of its most venerable Fellows, MR. WILLIAM WELLS of Cambridge. Mr. Wells had reached nearly the age of eighty-seven years, — an age which had of late precluded him from any active participation in our labors, — and his retirement had made him comparatively a stranger to most of our members. Yet those who were privileged to know him can truly say, that to the last his lively sympathy still followed with interest the literary and scientific movements of the day. Mr. Wells was endowed by nature with that exquisite taste which avoids in life, as in literature, all tints that do not blend and harmonize. No surer critic could be found of any work of genius, classical or modern; no safer arbiter of the appropriate and the true in social intercourse. His conversation was singularly fascinating, and it would be prized just in proportion as study and refinement had qualified the hearer to appreciate his highly cultivated intellect. To these mental endowments, to sound scholarship and fine taste and critical power, were added in Mr. Wells a most attractive sweetness and simplicity of character.

Of our two late Associate Fellows deceased during the past year, one, MR. NUTTALL, was personally known only to some of the older Fellows of the Academy, and perhaps mostly to those interested in Natural History. The other, MR. MANN, moved in a wider and more public sphere, and was too prominent and active in educational, reformatory, and political life not to attract a large measure of attention.

HORACE MANN was born in Franklin, Norfolk County, Mass., May 4, 1796. His early life was one of toil and sorrow. His father died in 1809, and he remained with his mother on the farm until 1816, when, after a hurried preparation by an itinerant teacher, he entered the Sophomore Class in Brown University, Providence, R. I., where he was graduated with the highest honors in 1819. After a few months spent in reading law, he was appointed to a tutorship in Latin and Greek at Brown University. He resigned this post in 1821, and was admitted to the bar in December, 1823; and immediately opened an office in Dedham, where he continued in the practice of law until 1833. In 1827 he was elected to the General Court, and annually re-elected until 1833, when he removed to Boston. From that time until 1837, he was a member of the State Senate, continuing also in the practice of his profession. He then became first Secretary of the Massachusetts Board of Education, and for twelve years was indefatigable in those labors which have given him an enduring fame. In the spring of 1848, he was chosen to succeed John Quincy Adams in the National House of Representatives, re-elected in November, 1848, and again in November, 1850. In September, 1852, he was elected President of Antioch College, at Yellow Springs, Ohio, which was opened in October, 1853, and over which he presided to the day of his death, which occurred on the second day of August, 1859. The distinguishing traits of his character were his unwavering fidelity to his convictions, and the passionate intensity with which he gave himself to the work before him. He usually had some chosen great end in view, to accomplish which he labored with a zeal and energy of which few, even of the strongest men, are capable. The Asylum at Worcester is perhaps the noblest of the monuments which attest his efficiency when a member of the State Legislature; the great and sudden improvement of the common schools in Massachusetts shows that his oft-quoted and oft-praised reports give no exaggerated view of his ability and success as Secretary of the Board of Education; the feelings which, after a lapse of eight years, are awakened in Massachusetts by any allusion to his course in Congress, bear conclusive testimony to his intense devotion, while there, to the single cause for which he took a seat in the House; and the voice of his pupils at Antioch College assures us, that, for the last six years of his life, he gave himself up wholly to the interests of his charge. Abstemious and economical in his habits, he was generous to those who needed his aid; full of tender affections, and repressing them only for fear that they should lead him to be too lenient to wrong-doers. So great was his scorn of all vice, and so unflinching his exposure of moral weakness, that few knew how deep and loving was his heart. His chief fault arose from that which was his highest virtue. Careful to attempt only what he thought he ought to do, he considered success to be a duty, and threw himself upon his work with such an intense energy as to render him incapable, for the time, of seeing the possibility of any other course, or any other opinion. But this want of breadth was atoned for by the superior effectiveness which it gave him in behalf of whatever he undertook.

THOMAS NUTTALL was born of humble parents at Settle, in the West Riding of Yorkshire, in the year 1786, and died at Nutgrove, (an estate in Lancashire bequeathed to him by his uncle,) on the 10th of September last. Although his life began and closed in England, nearly his whole scientific career belonged to this country, and was devoted to American Natural History. When he immigrated to the United States in 1808, at the age of twenty-two years, he no doubt brought with him a fondness for the pursuits in which he afterwards excelled; but his knowledge was acquired here, mostly in the field, and through his own explorations. His extended explorations began, within two years after his arrival in this country, with a journey up the Missouri River, in company with Mr. Bradbury, — a journey at that day perilous; and it was with much suffering and danger that the small party penetrated to some distance beyond the Mandan villages, where they were robbed by the Indians and narrowly escaped with their lives.

Between 1811, when he returned to Philadelphia, and 1817 Mr. Nuttall had visited the more accessible portions of the United States; and in 1818 he published his " Genera of North American Plants," — his largest, and, considering the period and the circumstances of its production, much the best of his botanical works.

The next year his equally perilous journey up the Arkansas River and its tributaries was undertaken, the principal results of which were published in his " Narrative of a Journey into the Interior of Arkansas," with an Appendix full of interesting scientific and ethnological information; and in several separate botanical memoirs.

After the death of Professor Peck, in 1822, Mr. Nuttall was called to supply his place at Cambridge, which he did for ten years; during which he produced his admirable " Manual of the Ornithology of the United States and Canada," as well as several botanical, ornithological, and mineralogical papers. Leaving Cambridge in the winter of 1833 – 4, he made a third and more successful attempt to penetrate and explore the western part of the continent, then so imperfectly known. Joined to Captain Wyeth's party, he crossed the Rocky Mountains by the pass at the South Fork of the Platte, reached the coast of Oregon, visited the Sandwich Islands, and the coast of California in the vicinity of San Francisco, Monterey, and San Diego, and returned to Boston by a voyage around Cape Horn.

The scientific results of this exploration, and of some other collections, so far as they have been published or elaborated by Mr. Nuttall himself, are contained in three memoirs in the Transactions of the American Philosophical Society, in the first volume of Torrey and Gray's Flora of North America, and in Nuttall's three volumes supplementary to Michaux's North American Sylva.

In 1842 the death and legacy of his uncle recalled Mr. Nuttall to England, to an estate upon which he resided, with the exception of a visit to the United States in the autumn and winter of 1846 – 7, until his death, in September last, at the age of seventy-three.

Mr. Nuttall was a person of great simplicity of life and manners, and of extremely retiring habits, though affable and communicative when with congenial companions. Although fond of every department of Natural History, and a proficient in ornithology and mineralogy, to our knowledge of which he made useful contributions, his favorite pursuit was Botany. His earliest and principal work, the Genera of North American Plants, revealed talents for observation and description of a high order, and a quickness in detecting natural affinities which seemed to be intuitive, and was certainly very remarkable for that day. Altogether, the name of Nuttall must ever stand very high among the pioneers of botanical science in the United States.

The three names which now disappear from the roll of our Foreign Honorary Members, belonged one to each of our three Classes. They are those of the great Engineer, the great Geographer, and of one of the most distinguished Greek scholars of the age.

STEPHENSON died in October last, in middle age; RITTER, on the 28th of September, in his eighty-first year; THIERSCH, near the end of February, in his seventy-seventh year.

ROBERT STEPHENSON was the son, pupil, and companion of the illustrious George Stephenson, — a man to whose genius, persevering industry, and practical good sense our age is more indebted for its greatest instrument of civilization and material progress, than to the talents or labors of any other individual. Inheriting a good measure of his father's mental endowments, and judiciously trained in the physical and mathematical sciences, by which his talents were developed, strengthened, and directed, without being smothered or distorted by an excess of mere learning, our associate opened upon his career, as assistant to his father in building the Liverpool and Manchester railway, and in perfecting the locomotive which triumphed over all its competitors in 1829. The completion of this road and engine established the fact that railways were to become the greatest instrument of intercourse amongst men, and were to carry the power of civilization wherever the dry land appeared.

On the formation of the London and Birmingham company for the commencement of the road which was to become the central line of England, Mr. Stephenson, although hardly thirty years old, received the appointment of Chief Engineer, when he soon established a reputation second only to that of his father; and on the gradual retirement and subsequent death of the latter, he became, in public estimation, though not without rivals, the first railway engineer in Europe.

This is not the time nor the place to review his controversies with some of his rivals, who, with more ambition than genius, attempted to surpass his constructions, and those of his father, by mere excess of dimensions, — for which they received from many persons a praise which should be accorded only to improvements of mechanical construction or organization. It is enough upon this subject to say, that the experience of the few years that have yet elapsed has shown, as far as so short an experience can show, that upon all these subjects of controversy Mr. Stephenson was mainly in the right; nor has it yet appeared that in his long and diversified career he ever made what may be called an engineering blunder. Praise like this can hardly be accorded to any one who has gone before him.

Of all the works of Mr. Stephenson, the tubular bridge, of which the first was constructed to cross the Menai Strait, is that upon which his reputation for genius will mainly rest. In the construction of the railway and locomotive, no high claim as an inventor can be accorded to him, for not only his father, but Trevethick and many others had preceded him; but the tubular bridge is the embodiment of a high original conception, at once bold and practical; and although it will probably never be of common use, yet there have been and must hereafter occur extraordinary obstacles, which cannot be so well overcome in any other way.

Our colleague was fortunate, not only in his paternity, but in his time; — a time when the wealth of a long peace and the activity of a great empire were lavishly poured out under an excessive, perhaps morbid, excitement for railway improvements. This, added to the great aid derived from the recent improvements in all the useful arts, gave him a success that no genius or activity at any preceding time could have brought to his career, — a career that posterity will not fail to recognize as having left a deep impression upon our age.

FREDERICK WILLIAM THIERSCH, one of the most distinguished philologists of the age, was born at Kitscheidungen near Freyburg, June 17, 1784. His early education was pursued in the schools of his native town; he studied afterwards at the Universities of Leipsic and Göttingen, and took his doctor's degree at Göttingen in 1808, immediately after which he was appointed Professor in the Lyceum of that place. In the following year (1809) he was called to Munich as

Professor in the University just established there. The condition of the country was such, on account of the military movements of the time, that young Thiersch was only able to reach his destination in safety by joining a French corps, and marching equipped like a common soldier. He found that learning in Bavaria was at a very low ebb, and he at once devoted himself to the promotion of education and literature with extraordinary zeal and ability. It was through his influence over the most enlightened men of the kingdom that classical studies, including the archæology of art, first assumed the prominent position which they maintain at the present day in the Bavarian capital. In 1812, he founded the Philological Seminary, which soon became an important part of the University, and in the same year commenced the publication of the *Acta Philologicorum Monacensium.* Thiersch took a lively interest in the fortunes of Greece, and was one of the first among the European scholars to predict the restoration of her nationality. In 1814 he went to Vienna, and, meeting Count Capo d'Istria there, assisted in founding a Greek society of the friends of literature (the φιλόμουσσι), and afterwards the political society intended to embrace the leading Greeks wherever found, and called the *Hetæria.* When the war of independence broke out, in 1821, his zeal in the cause influenced the king and court of Bavaria to lend their aid to the establishment of the Greek nation. In this and other ways he proved himself to be a constant and most valuable friend to the Greeks. Soon after the close of the war he visited the country, and made a careful study of its actual condition. The results of his observations were given to the world in 1833, in a work written in French, and entitled *L'Etat actuel de la Grèce;* and it is to him more than to any other, that Prince Otho was indebted for his election to the throne of Greece. The other writings of Professor Thiersch are on Public Education, on Ancient Art, editions of the Greek Classics, and numerous contributions to the transactions of the Royal Bavarian Society of Sciences, of which he was President for several years. In 1858 the jubilee of Mr. Thiersch's doctorate was celebrated with great enthusiasm at Munich. Deputations from all the leading Universities of Germany, and from numerous learned societies, were sent to Munich with addresses and congratulations. Orders of knighthood were conferred upon him by German sovereigns and by the king of Greece, in token of their high estimation of his character, abilities, and learning. The young Greeks studying in the University of Munich sent to him a lyrical poem in the ancient language of their country, written by Bernadahes, one of their number, who has since distinguished himself in poetical literature, and the University of Athens addressed to him a grateful letter, written in Classical Greek by Professor Philippos Johannis, one of the most accomplished teachers, and in that year the *Prytanis* or Rector of the University. Professor Thiersch, it is understood, has left an edition of Æschylus, which he had prepared with a view to its publication after his death.

By his decease the world has lost a scholar of large and various acquirements, a man of elevated principles and pure character, of amiable temper and cordial manners, an acute and tasteful critic in literature and art, an author whose works take rank among the most learned productions of the age, a friend and supporter of learned institutions and of liberal principles of government.

CARL RITTER, the renowned author of the *Erdkunde*, &c., — or "The Science of the Globe in its Relation to Nature and to the History of Mankind," was born in Quedlinburg, a town of Prussian Saxony, on the 7th of August, 1779. When he had passed only two years as a student at the University of Halle, he became, for eighteen years, a private tutor in the family of Mr. Hollweg, a wealthy banker of Frankfort, where the celebrated statesman and minister, Von Bethmann-Hollweg, was one of his pupils. In 1814, after prolonged travel in the middle and south of Europe, he brought his two pupils to the University of Göttingen, where he produced, in 1817 and 1818, the first and second volumes of the first edition of his great geographical work. Two years after, mainly through the instrumentality of William Humboldt, then Minister of Public Instruction, he was called to Berlin, as Professor of Geography at the Royal Military School and at the University, — where the first chair, it is believed, devoted to that special branch of knowledge in any German university, was created for him.

Here, besides other writings, he published, in 1822, the first volume of a second and much enlarged edition of his *Erdkunde*. This — after ten years of intense academical activity, largely occupied by the preparation and delivery of the courses of public lectures which gave him such renown as a teacher — was followed in 1832 by a second volume; and from that time down to 1838, six more volumes, or one volume a year, attest his wonderful industry and learning. In the twenty-one succeeding years, that is, to the close of Ritter's life, eleven volumes more, or one volume every other year, tell of his ceaseless activity, notwithstanding his advancing age. The first volume was devoted to Africa; the nineteenth, which nearly finishes Asia, was published only a few weeks before his death.

Ritter's personal qualities and character — as one of our colleagues, once his favorite pupil, informs us — were exceedingly attractive and admirable. The same competent judge, himself a distinguished cultivator of geographical science, pronounces that "the peculiar turn of Ritter's mind was more intuitive than logical, more synthetical than analytical, more objective than subjective. . . . . . While, therefore, his views and his method are entirely original, we seek in vain in his works for a formal system, an absolute idea rigorously carried out. His unflinching loyalty to the truth, as he sees it, not as he infers it may be, seems to render such systematization uncongenial to his mind. He shrinks, indeed, from all cold and formal definitions. Even his most characteristic conceptions, those which constitute the spirit of his method, preserve much of the nature of deep intuitions, — the expression of which is always highly suggestive, but often lacks the clear, logical shape which make them easy to define, and would give them immediate currency. With a mind essentially constructive, he descends, nevertheless, with the most scrupulous care into the study of details; and it is upon the well-secured basis of facts alone, and with a sense of the true sometimes almost amounting to divination, that he builds up his broadest generalizations. It may be inferred, accordingly, that Ritter possessed in a high degree that noble endowment of the greatest students of nature, that plastic imagination which gives the power to keep before the mind true and vivid conceptions of natural objects, whether in their isolation or in combination, as in one great picture, — so obtaining deeper insight into their whole relations than any mere analytical process could ever afford."

The fundamental idea of Ritter's whole geographical writings — still to use the language of our colleague, with some condensation — is "a strong belief that our globe, like the totality of creation, is a great organism, the work of an All-wise Intelligence, — an admirable structure, all the parts of which are purposely shaped and arranged, and mutually dependent, and by the will of the Maker fulfil, like organs, specific functions, which combine themselves into a common life. But with Ritter this organism of the globe comprises not only nature, but man, and with man, the moral and intellectual life. Old as is this idea of the Cosmos as applied to the physical world, it was Ritter's merit to have made a special and most happy application of it to geographical studies. No one before him had perceived so clearly the hidden but strong ties which mutually bind man and nature, the close relations between man and his dwelling-place, between a continent and its inhabitants, — influences which stamp races and nations each with a character of their own. Considered under this aspect, every portion of our globe, stamped by nature with a peculiar character, assumes new meaning and importance. As the body is made for the soul, so, upon this view, is the physical globe made for mankind."

What the *Philosophy of History* is in the field of human society, such, with the physical world for its subject, is the *Philosophy of Geography;* and of this new science, Carl Ritter may be said to have been the founder.

As to the present *personelle* of the Academy, the Council report, — that

The actual number of Resident Fellows is		155
Of which the First Class contains	47	
the Second Class "	48	
the Third Class "	60	

The Associate Fellows are 78 in number.

Of these, Class I. contains	33
" II. "	29
" III. "	16

The Foreign Honorary Members are 70 in number.

Of these, Class I. contains	26
" II. "	26
" III. "	18

They are distributed in sections as follows: —

Class I.

Section 1.	Mathematics	9	members.
" 2.	Practical Astronomy and Geodesy	6	"
" 3.	Physics and Chemistry	8	"
" 4.	Technology and Engineering	3	"

Class II.

Section 1.	Geology, Mineralogy, &c.	6	members.
" 2.	Botany	7	"
" 3.	Zoölogy and Physiology	8	"
" 4.	Medicine and Surgery	5	"

Class III.

Section 1.	Philosophy and Jurisprudence	4	members.
" 2.	Philology and Archæology	8	"
" 3.	Political Economy and History	4	"
" 4.	Literature and the Fine Arts	2	"

Finally, the Council made nominations of several distinguished persons to be chosen Foreign Honorary Members and Associate Fellows.

On motion of the Vice-President, it was voted that the Chairman of the Rumford Committee be authorized and directed to reclaim the possession of the die of the Rumford medal, now deposited at the United States Mint, Philadelphia, and to place it in the safe of the Academy.

Appropriations were voted, — On motion of the Treasurer, of twelve hundred dollars for general expenses during the current year ;

On motion of the chairman of the Committee on Publications, of fourteen hundred dollars for printing the Academy's publications;

On motion of the chairman of the Library Committee, of eight hundred dollars for the purchase of books and other expenses of the library.

The annual election was held, and the following officers were chosen for the ensuing year: —

Jacob Bigelow, *President.*
Daniel Treadwell, *Vice-President.*
Asa Gray, *Corresponding Secretary.*
S. L. Abbot, *Recording Secretary.*
J. P. Cooke, *Librarian.*
Edward Wigglesworth, *Treasurer.*

Council.

J. I. Bowditch, Joseph Lovering, E. N. Horsford,	of Class I.
Louis Agassiz, Jeffries Wyman, J. B. S. Jackson,	of Class II.
James Walker, Henry W. Torrey, Robert C. Winthrop,	of Class III.

The Standing Committees, nominated by the President, were elected as follows: —

Rumford Committee.

Eben N. Horsford, Joseph Lovering,
Daniel Treadwell, Henry L. Eustis,
Morrill Wyman.

Committee of Publication.

Joseph Lovering, Jeffries Wyman,
Cornelius C. Felton.

Committee on the Library.

A. A. Gould, W. B. Rogers,
George P. Bond.

Committee to Audit the Treasurer's Accounts.

Thomas T. Bouve, C. E. Ware.

Committee of Finance.

Jacob Bigelow, Edward Wigglesworth,	*ex officio*, by statute.

J. I. Bowditch, by appointment.

Professor C. W. Eliot presented a memoir by F. H. Storer and himself on the Impurities of Commercial Zinc, with special reference to the residue insoluble in dilute acids, to Sulphur, and to Arsenic.

The Corresponding Secretary presented, from the authors, the following paper: —

Description of two new Genera and eight new Species of Fossil Crinoidea, from the Rocks of Indiana and Kentucky. By S. A. Casseday and S. S. Lyon.

DICHOCRINUS, *Münster.*

In a *résumé* of this genus by MM. De Koninck and Le Hon, they state that, up to the appearance of their work,* only three species of this genus had been described; they add six, which, together with eleven described by American geologists, make in all twenty species. This comprises all the species of which we have any personal knowledge.

Heretofore much uncertainty has existed as regards the number and disposition of the radials and the arms. De Koninck and Le Hon give the following formula: —

Basal pieces . . .	2	
Radial pieces	4 × 5	
Inter-radials . . .		Unknown.
Anal piece	1	Known.
Arms	10	

Dr. B. F. Shumard, in some remarks about this genus, states as follows: — "The anatomical structure of a very perfect specimen of this genus corresponds only in part with the above formula. In our fossil we find a base of two pieces, supporting a circle of five large radials and one large anal piece, as in all known species of this genus. The radials however, are not repeated, but each one immediately gives rise to two brachial pieces, which are pentagonal, and in turn support, each, two simple arms; so that the number of the latter amounts to twenty."†

The Messrs. Austin, who up to this time have figured the most perfect examples of the genus, represent the number of radial pieces to be twenty, i. e. "five repeated four times."

"In *D. ovatus* there appear to be but ten, i. e. five repeated twice;

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* *Recherches sur les Crinoides.*

† Trans. Acad. St. Louis, Vol. I. No. 1, p. 71.

while in *D. cornigerus* and *D. sexlobatus*, now described for the first time, the whole number of radials is only five."

In a number of well-preserved individuals of *D. polydactylus*, we have always found three radials, and on examination of other species we have concluded this to be the number most frequently met with. The following list contains all the species of Dichocrinus which show in a satisfactory manner all the radial pieces.

D. cornigerus	1 × 5
D. ficus	3 × 6
D. fusiformis	3 × 5 [*]
D. ovatus	3 × 5
D. polydactylus	3 × 5

D. simplex also will doubtless show three radial pieces when perfect examples are found; *D. cornigerus* differs from other species in having two brachials coming immediately from the primary radial. This is the only species showing satisfactorily such an arrangement. Shumard quotes, above, *D. ovatus* as having two radials repeated five times, yet in his description of the species (Owen and Shumard, Geol. Survey of Iowa, &c., p. 590) he says, "Several joints of the arms remain attached to one of the superior plates, in the *only specimen* we have been able to procure. The first joint is of a rectangular form, and supports a cuneiform joint, on the bevelled edges of which is the commencement of the two series of smaller plates." The formula for the radial pieces will be, —

Radial pieces . . . . 1 to 3 × 5.

Arms. But few specimens have been figured preserving the arms. They generally come off in five pairs, often bifurcating below, until they attain even to the number of forty divisions, as in *D. polydactylus*. *D. fusiformis* has ten arms (five pairs) without bifurcations. *D. ovatus* has, most probably, the same number. *D. polydactylus*, as we have said above, has with the bifurcations 8 × 5 = 40. *D. cornigerus* which differs considerably from all other species, has 4 × 5 = 20. *D. ficus* has six pairs, 6 × 2 = 12, again bifurcating on the first joint, producing twenty-four arms or fingers. We may readily suppose that the greater number of the species of this genus have five pairs of arms, bifurcating once or more. The arms are long, fimbriated, and composed of cuneiform pieces, either in single or double rows.

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[*] Austin (Monograph of Crinoideæ, pl. 5, fig. 6, c) figures a single ray as having three small radials above the large primary radial. His specimen (pl. 5, fig. 6, b) is very imperfect, and we think it highly improbable that four radials exist in the individual there figured; such a mistake is more easily made than mistaking *Dichocrinus elongatus* for a *Platycrinus*. *Hexacrinus macrostatus* of the same authors has all the appearance of a *Dichocrinus*. (*loc. cit.*, pl. 6, fig. 3, a.) J. Müller in his paper (Über neue Echinodermen des Eifeler Kalkes, pl. 1, fig. 3) figures a fossil which bears a most remarkable resemblance to a *Dichocrinus*; he calls it *Hexacrinus*.

Inter-radials. Shumard is the only author who notices inter-radials. He says, that "from four to five exist in two of his species, they rest on the oblique superior lateral edges of the radial plates." They might easily be mistaken for the lower pieces of the vault.

We propose, then, the following formula for *Dichocrinus:* —

Basal pieces	2
Radial pieces	1 to 3 × 5
Inter-radial pieces	4 to 5 × 5
Anal pieces	1 to 5
Arms	5 pairs, bifurcating.
Columns round.	

The vault, in all the specimens where we have seen it preserved, is large, high, and more or less ornamented with thorns and salient tubercles. This genus differs so markedly from the genera *Platycrinus* and *Hexacrinus*, both in the more elongated form, the bipartite basis, and its deep angular notch on the anal side, that it admits of an easy distinction. It approaches quite nearly to *Cotyledonocrinus* and *Pterotocrinus*, having like them a bipartite base, with a series of large pieces about it. *Cotyledonocrinus* has only five pieces arising from the basis, instead of six, the arms are non-bifurcate; the difference between this genus and *Pterotocrinus* is so marked that they cannot be confounded.

DICHOCRINUS POLYDACTYLUS, *Sp. Nov.*

Body. Subconoidal, resembling the ornate capitals of some composite columns, spreading rapidly from the base, the upper portion marked by prominent folds of salient tubercles. The whole of the pieces of the calyx are thin.

Vault. Surmounted by a large proboscis: column small, subrotund.

Basal pieces. The two basal pieces are large, spreading rapidly from a small base, similar in size, obscurely heptagonal; at the terminations of the diameter opposite from the one which makes the suture line they are prolonged into quite acute angles, forming the two obscure angles of the heptagon. Immediately above the columnar pit, or a very little below it, is a series of massive tubercles irregularly disposed, and varying in size, the remainder of the bases being comparatively smooth. From the margin of the columnar pit extend, in the direction of the arms, four raised folds, two on each piece, ornamented by several tubercles and striæ.

Radials. The first are very large, pentagonal, trapezoidal in shape, their upper facets being much wider than the lower ones. They extend out as far as the first or second pieces beyond the axillary radials; the middle portions are swollen out into folds or plaits; their junction with the second radials is distinguished by a large tuberous knob, beneath which are one or two smaller ones. A number of striæ regularly disposed, and a few minute granules are scattered over the surface of the pieces. This raised median line of the radial pieces produces broad intervalla between each two of them. The second and third radial pieces are very minute; the second join the first radials at the knobby prominence described above; the third are axillary, and give off two rays each.

Inter-radials. One large inter-radial is placed between each pair of arms.

Anal piece. At one termination of the articulating facet of the basal piece (the other being at the anterior radial piece) is situated a single anal piece. It is not so wide as the radials, but of the same length, pentagonal; as in the radials, its centre is elevated, it differs from them in the portion where the second radials join the first; on the radials there is a well-defined, articulating facet, whilst on the anal piece none exists, the piece being solid and continuous throughout.

Vault. We have no specimen showing the vault; in one example before us, there is a proboscis much crushed and misshapen; it is large, composed of many small, coarse, tubercular pieces, and extends not quite one third the length of the arms. Its terminal point is apparently formed by two circles of pieces surrounding a single one.

Arms. From each third radial come off two arms. They are about three times as long as the body, and arranged as follows: in each arm six quite stout quadrangular pieces, rounded on the dorsal surface, are superimposed upon each other; the sixth are axillary, each give off two slender fingers, which are composed of the following pieces: first, one or two quadrangular ones, upon them from five to seven somewhat smaller wedge-formed ones placed one above another, the large end of one wedge being placed over the small end of the next, the wedges becoming gradually more acute, until on the sixth or seventh piece there commences a double row of small, quite acute, pentangular pieces, which alternate with each other, the salient edges of one row fitting into the retreating angles of the other row, the points of their junction being lateral, not central, as in most other genera having similar arms. Yet two more fingers exist on each arm; they are situated on the outer surfaces of the six pieces described above (the first one on the second piece from the last radial, the second one on the fourth piece from the same radial), the inner surfaces having no branches, and lying close together throughout their whole extension. They spring apparently from the sides of the pieces, the facets being on the sides, rather than on the top as in a regular axillary piece; curving out gracefully for a short distance, they continue in a straight line to their ends without any further bifurcation. They are slender, composed of pieces exactly similar to those of the fingers already described. On either side of the ambulacral grooves of the fingers is a row of stout pinnulæ.

Dimensions: —

Height of calyx to insertion of arms . . .	.55	inch.
Diameter at the arms	.85	"
Height of basal pieces	.26	"
Length of arms	2.00	"
Length of proboscis (variable proportion in diff. sp.)	.60	"

Geological Position and Locality. Rare in the silicious mud beds at the top of the Knob member of the subcarboniferous limestone, Hardin County, Kentucky; Montgomery County, Indiana, &c.

Dichocrinus symmetricus, *Sp. Nov.*

Body. The general form of the body is subconical; from the basis to the summit of the first radials it is basin-formed, above which it contracts upward and terminates in a point, formed by the large spinous piece which surmounts the vault.

The *basal pieces*, two in number, are of equal size, pentagonal; line of junction with each other straight, forming when united an irregularly-sided octagon. The columnar pit is shallow, oval; columnar facet obscurely pentagonal; perforation small and round. The pieces are prominent near the line marking their junction to those resting upon them, being suddenly reflected upward.

Radial pieces five, subquadrangular, the largest as wide as high, diminishing in size from the anterior piece on either side to the anal piece, swelling from the base and sides toward the superior margin, irregularly truncated above, slightly depressed at the summit between the pieces.

Second radials. Fragments of the second radials are attached to some of the first radial pieces; they are minute, and rise within the superior margin of the first radial pieces. The precise form of the second radials is not known.

Inter-radials. Between each group of arms, resting in the depression between the radials, is a single piece, usually pentagonal in form; it rises nearly as high as the opening into the body at the arms.

Anal pieces. Rising from the deepest angular notch at the junction of the basal pieces, is a large piece, the lower part of which is similar in form to the first radials, rising higher than they do; the upper margin is horizontally truncated about one third the breadth of the piece; the sides above the radials angularly sloping toward the top of the radials on either side; the centre of this piece supports one, and the sloping sides each support a piece of the second range of anal pieces; those on the sides correspond in size, form, and position, to the inter-radial pieces above described. These are again succeeded by a third range of pieces, triangular in form, three in number, the central one of which reaches the mouth (?), which is surrounded by three additional, small, long, narrow pieces. The series of pieces under the mouth are slightly depressed above the second range.

Summit. The summit above the radials recedes a considerable distance within the upper margin of the calyx. It is covered by numerous small polymorphous pieces, six of which are spinigerous; the largest and most prominent of these occupies the centre of the summit, immediately in contact with the pieces surrounding the mouth; the other pieces forming the second series of those rising above the openings into the body at the arms. The two spinous pieces above the arm-pieces of the postero-lateral rays form a circle around the central piece, the anterior part of the summit having one more range of pieces above the arms than above those arms on either side of the anal field. Beneath each of the small spinous pieces above the arms is a pentangular piece, the inferior margins of which are prolonged into an acute angle, separating the openings into the body into two equal parts, the upper portion of these pieces supporting the spinous pieces above the arms, the lateral upper portion supporting a piece on either side: these last pieces are prolonged downward, and curved around the outer sides of the arm openings, the outer margins of those touching each other form a closed ring, with the piece between them around the summit, except on the anal side. The lower margins are supported on either side by the upper margin of the inter-radial pieces. On the anal side are two additional pieces, nearly square, resting between the last pieces above described and the spinous pieces, and the pieces described above as anal pieces.

Arms. The openings into the body are five pairs; the arms are in all, probably, ten in number: their form is unknown.

Column. Unknown. We are indebted to Professor J. M. Safford, of Tennessee, for the beautiful specimen figured in his report.

Dimensions: —

Greatest diameter of basis	.25	inch.
Least " "	.20	"
Vertical height of calyx	.20	"
Length of first radials	.20	"
Height of specimen	.55	"
Greatest diameter of calyx	.45	"

Geological Position and Locality. Rare in the upper beds of the cavernous member of the subcarboniferous limestone, in Breckinridge, Grayson, Edmondson, Hart, and Warren Counties, Kentucky. Vertical range, so far as at present known, about sixty-five feet, reaching from the base of the first sandstone of the millstone-grit beds to the first white bed beneath.

DICHOCRINUS ELEGANS, *Sp. Nov.*

Body. Viewed from above the outline of the summit is stellate; the deep grooves between the arms and the anal side would produce a sinuous stellate figure in any section above the calyx. The calyx is somewhat basin-shaped, but it is much more erect than in *D. symmetricus.* The rounded form of the first radials is continued to the top of the second piece above the arms, dividing the body into five prominent ridges.

Basal pieces two, of the same form and size, prominent; a broad, shallow, elliptical depression surrounds the column: columnar pit small and shallow, the line marking the junction of the pieces straight.

Radial pieces five, obscurely hexagonal, about as broad as high, rising suddenly from the lines marking the lateral margins of the pieces; the upper corners truncated, thus forming an angular depression between the pieces for the reception of the inter-radial pieces.

The *second radials* appear to have been quite small, and to have stood prominently forward upon the summit of the first radial pieces; the facets by which they were attached to the first radials are all that remains of them; further their form and arrangement are unknown.

Inter-radials. The inter-radials are quite small, lozenge-shaped; they each support two interbrachial pieces of similar form.

Anal pieces. The first anal piece rests in the deepest angular notch in the basis, rising considerably higher than the first radials; like them it is hexagonal; upon it rests a small hexagonal piece; this in turn supports upon its upper margin a pentagonal piece, the upper part of which is elongated, and reaches to the oral (?) opening. Between the first and second anal pieces, also between the second and last piece described, rests, on either side, one small, lozenge-shaped piece, the lowest forming one side of the circle about the arm openings, the upper pair supporting small, pointed pieces lying above the arms on either side of the anal field.

Summit. The summit is covered by numerous small pieces, as in *D. symmetricus.* A spinigerous piece rises in each group above the arms; the pieces surrounding the mouth are quite small, angular, the apex of the angle toward the oral opening; they are about six in number, and form a slight elevation upon the otherwise plane summit, the oral opening being above the general level of the top of the vault, the level part being covered by about ten polymorphous pieces. The condition of our specimen is such that the arrangement of the pieces surrounding the arm orifices cannot be satisfactorily made out; the pieces appear to be more numerous than in *D. symmetricus*, and the arms seem to have come off from the body in sets of four; making twenty arms at the body.

Arms. The form of the arms unknown.

Column. Unknown.

Dimensions: —

Greatest diameter of the basis	.20	inch.
Least " " "	.15	"
Height of the first radials	.15	"
Greatest width of radials	.15	"
Height of specimen	.40	"
Greatest diameter	.42	"
Least diameter	.32	"

Geological Position and Locality. This elegant little crinoid is quite abundant near the top of the cavernous beds of the subcarboniferous limestone, Edmondson County, near the Mammoth Cave. Good specimens are rare. The vertical range of this species, so far as ascertained, is about thirty-eight feet.

Remarks. D. elegans is nearly allied to *D. symmetricus* and several undetermined species; it will readily be distinguished from *D. symmetricus* by its more erect figure, the absence of the strong spinous central piece at the summit, by the greater prominence of the arms, as well as the larger number at the body, and the consequent greater number of small pieces making up the clusters about the arm facets.

Dichocrinus ficus, *Sp. Nov.*

Body. Subovoid, inflated near the centre of the length of the first radial pieces, from which it contracts toward the summit of the calyx; contracting regularly toward the column, around which it is inflated. Columnar pit small, slightly depressed.

Basal pieces two, similar in form and size, obscurely pentagonal; dividing line straight; the summit of the pieces united present five slightly curved depressions, and one angular notch for the reception of the radial and anal pieces.

Radial pieces, first series five, similar in form and size, a little higher than wide, subquadrangular; the upper margin slightly indented near the middle for the reception of the radials of the second series. *Radial pieces, second series,* five, minute, semicircular, buried in the indentation at the summit of the first radials. *Radial pieces, third series,* small, depressed, cuneiform, axillary; the oblique upper margins of each support two arms.

Anal piece, — one, similar in form and size to the first radial pieces; like them it bears a second and third radial, and a pair of arms.

Arms. Twelve, composed of rather long, quadrangular pieces, rising from the third radial piece and bifurcating on the second piece above it. Only two ossicula above the bifurcation are preserved on our specimen. The arms are slender.

Vault. Our specimens do not show the vault. It is unknown.

Column. Small, near the body, composed of thin pieces of equal size and thickness; the edges are rounded.

Dimensions: —

Height of calyx	.45	inch.
Greatest diameter	.30	"
Diameter at base of the arms	.25	"
Height of radials	.22	"

Geological position and locality. Rare, in beds at the top of the sandy mud beds at the base of the subcarboniferous limestone, Clear Creek, Hardin County, Kentucky; Montgomery County, Indiana, &c.

Dichocrinus sculptus, *Sp. Nov.*

Body. Short, conical, regularly expanding from the column to the summit of the first radials; the basals and first radials are elaborately ornamented by prominent irregular carinæ, which generally lie nearly parallel to the vertical sides of the pieces.

Basal pieces. Two; similar in form and size, pentagonal; dividing line straight; columnar facet large, prominent, expanded, producing a rim around the column and the margin of the calyx. The joined basal pieces have four curved and two angular depressions at the summit; the deepest and largest of the latter marks the anal side.

Primary radials: first series five; subquadrangular, one third higher than wide, inflated at the junction with the second radials, which rise from a depression in their upper margin. The *radials of the second and third series* (?) are absent; their form is unknown.

Anal piece. One; similar in form and arrangement to the radials of the first series.

Arms. The form and number of arms are unknown.

Column. Unknown.

Dimensions: —

Height of calyx	.27	inch.
Diameter at summit of first radials	.30	"
Diameter of inflation at the insertion of the column	.10	"

Geological position and locality. A single specimen of the calyx was obtained from the first limestone above the base of the millstone-grit beds, in Hardin County, Kentucky.

Remarks. The ornature of this beautiful crinoid will distinguish this from all other known species.

COTYLEDONOCRINUS, *Nov. Gen.*

Generic formula: —

Basal pieces, . . . 2.
Radial pieces, . . 3 × 5; first large and long; second minute; third small, axillary.
Secondary radial pieces, 2 × 10.
Arms, ... 10; long, ciliated.
Inter-radial pieces, . 3 × 5; small.
Mouth subcentral.
Summit covered by many polymorphous pieces.
Column round, small, formed of alternate large and small thin pieces.
Radial pieces all arm-bearing.
Anal piece none.

COTYLEDONOCRINUS PENTALOBUS, *Sp. Nov.*

Body. When the arms are absent the body is a long ovoid figure; the summit contracting rapidly, while the lower portion of the calyx, as high as the top of the basal pieces, is rather more elongated. The base is rounded, and intumescent about the column. The two *basal pieces*, when united, form a conical cup about as deep as wide, having four slight concave depressions on its upper margin, and one angular notch. The junction of the basals rises between the concave depressions, dividing them into pairs, the angular notch being equally taken from the pieces on either side of the line dividing them. Columnar pit small, the presence of the column in our specimens concealing its depth; it is probably quite shallow.

The *first primary radials* are large, more than twice as high as wide, a little wider in the middle of the length of the pieces than at the ends. The *second* and *third* primary radials are buried in an excavation at the summit of the first radials. There is no gibbosity or swelling at the insertion of the second radials; the first radials appear to run under them perfectly smooth.

Second primary radials five; they are very minute, lunette-formed, less than a semicircle, slightly depressed at their upper margin.

Third primary radials, five; small, leaf-like, resting upon the second radials, spreading beyond them, the outer margin expanding upward. The centre of the pieces is prolonged upward into a little tongue-like figure; on either outer margin is also a prolongation about half as wide as the centre one, and of nearly equal height, leaving a deep, square-like notch on each side of the centre prolongation of the pieces.

First secondary radials. These pieces are ten in number, two to each third primary radial; they are similar in form and size, about as high as wide, fitting into the indentations on either side of the third primary; they rise a little over one third of their height above the centre prolongation of the primary to which they are joined, are truncated obliquely downward and outward from their junction with each other; the outer margins falling into, and further expanding, the somewhat circular outline of the second and third primary radials.

Second secondary radials. Ten in number, resting on the bevelled upper margins of the pieces below them, nearly as high as wide, deeply indented for the reception of the first brachial pieces, thus divided into three tongue-like points, not unlike the centre point of the third primary, and two oblong circular depressions; each division of the upper margin of the pieces occupying about one fifth of its length; they are joined together by a straight line continuous with that marking the junction of the pieces immediately below them.

Arms. Twenty, delicate, three times as long as the calyx, each ray supporting four; they are non-bifurcate, composed of about six thin, irregular, oblong pieces above the first brachial, where they are composed of a double row of very thin pieces, joined in the centre of the arms by angular points, which fit into the alternate depressions on either side, the junction forming a serrated line; each of the pieces forming the double row composing the arms bears a long filamentous cilia, which is composed of very minute pieces, the length of which is about equal to their diameter.

Inter-radial pieces. Between each group of four arms, and rising in the notch between the first radials, are three, sometimes four, small inter-radial pieces; the first is pentangular, widest below the centre of the inferior margin, angular, the superior margin a horizontal line;

upon this are disposed the other pieces, one above the other, rapidly diminishing to a point.

Summit. The summit is divided into five fields; the division line appears to radiate from the centre of the summit to the centre of each group of arms. Four of these fields are nearly alike; the form and the arrangement of the pieces in each are similar; the fifth field, which lies above the junction of the basal pieces, between the pairs of circular depressions, supports a short rudimentary proboscis near its centre, about .01 of an inch in diameter, and about .15 of an inch in height, composed of a great number of small pieces (seventy to eighty). The pieces covering the fields are of irregular size, the general form inclining to triangular; some are quadrangular, one end of the piece being much narrower than the other; other pieces are elongated octagons.

Column. The column is round, delicate, composed of very thin pieces, the alternate ones larger and smaller; near the calyx the column suddenly enlarges to its insertion into the columnar pit.

No surface markings are visible.

Dimensions: —

Height of basal pieces	.20	inch.
" " first radial pieces	.40	"
" " second and third together	.03	"
Diameter of calyx	.45	"
Length of arms	1.00	"
Diameter of column	.02	"

Geological position and locality. Rare, in the third limestone above the base of the millstone-grit beds of Grayson Springs, Grayson County. Its vertical range appears to be quite limited.

Remarks. This elegant little crinoid is closely allied to *Dichocrinus* and *Pterotocrinus;* it differs from both genera in the number of pieces forming the series resting on the basal pieces. The deepest angular notch in the basis of both genera usually marks the anal side; in our genus the mouth is on the field, on the side directly opposite the only angular notch in the basis. All the pieces rising from the basals bear arms in our genus; but this is also true of DICHOCRINUS FICUS, which has six arm-bearing pieces, and no barren or non-arm-bearing piece, termed anal piece in this genus.

As genera and species are now defined, we are compelled to separate our genus from *Dichocrinus*. When these interesting animals have been further investigated, it is probable that a better classification may be introduced.

ALLOPROSALLOCRINUS, *Nov. Gen.*

Generic formula: —

Basal pieces,	3.
Radial pieces,	2 × 5.
Secondary radial pieces,	2 × 5.
Anal pieces,	3 to 4, or more.
Inter-radials,	1 × 4.
Arms,	11 to 13 ; variable, form unkown.

Column, small (?) ; form unknown.
Vault covered with numerous polygonal pieces.
Mouth proboscidiform.

ALLOPROSALLOCRINUS CONICUS, *Sp. Nov.*

Body conical; calyx plane or slightly saucer-shaped, columnar pit excavate, involving the basals and part of the pieces which close the circle around them.

Basal pieces three, two of which are much larger than the third, irregularly pentagonal.

Radial pieces. The first radials, five in number, are large, hexagonal, differing considerably in size; three rise upon the summit of the basal pieces, and two rest in the notches between them. The *second radial* pieces are pentagonal, axillary, differing in size and form, each of the two upper oblique margins supporting one of the *secondary radial* pieces; these, ten in number, vary in size and form; triangular, quadrangular, and pentangular pieces being all found in a single individual. These in turn support another series of pieces of the secondary radials, larger than the other pieces of the ray, twice as broad as high, subquadrangular, thick, indented by a deep sinus upon the upper margin. One of the postero-lateral rays, and sometimes both, have an additional secondary radial, in which case it is similar to the first secondary radials.

Arms. The arms vary in number; the regular rays support each two arms, and the postero-lateral ray to the left of the anal field supports three; making eleven arms. Sometimes both postero-lateral rays have three, and then the number is twelve. In some specimens, the ray to the left of the anal field supports four arms, and that on the right of it three; when this is the case, the arms are thirteen in number. The arm facet is large and nearly circular, and, as before stated, deeply grooved in the upper part; the piece of the vault which rests upon the arm pieces is also indented, the opening into the body being partly in these and partly in the arm pieces. The last pieces of the secondary radials form a closed ring around the calyx, except on the anal side.

Inter-radial pieces four, one to each field; they are the largest pieces forming the calyx, longer than wide, septagonal or hexagonal; they rise between the first radials, and reach the last secondary radials.

Anal pieces usually four; the first is hexagonal and rests on the basal pieces, its summit is truncated and supports the fourth anal piece, its oblique margins support two pieces, one on either side, nearly equal in size, pentagonal or obscurely hexagonal: the fourth piece is long, lanceolate, and extends between the pieces which support the arms, reaching to the vault.

Vault. The vault or summit is covered by rather large, polygonal pieces, interspersed amongst which are a few quite small ones. All the pieces covering the vault are prominent, and inflated in the centre.

Mouth nearly central. The form of the proboscis is unknown; it is broken from all the specimens which have come under our observation. The whole character of this species is coarse and robust.

Column. Unknown.

The *calyx* is covered by minute granular markings.

Dimensions: —

Height of calyx	.10	inch.
Greatest diameter of calyx	1.25	"
Height of specimen	1.05	"
Diameter of joined basal pieces	.25	"
Diameter of arm facets	.25	"

Geological position and locality. Rather abundant in sandy mud-beds at the top of the Knob-member of the subcarboniferous limestone, Clear Creek, Hardin County; also near Scottville, Allen County, Kentucky, &c.

ALLOPROSALLOCRINUS DEPRESSUS, *Sp. Nov.*

The general arrangement of the pieces of the calyx differs but little from *A. conicus.* There are, however, several distinguishing characteristics, rendering it necessary to separate it from that species.

A. depressus is always unsymmetrical, the mouth being subcentral and placed nearest to the anterior side. The postero-lateral rays always bear three arms each. The summit is always depressed or inclined to the anterior side, and the columnar pit is more angular than in *A. conicus.*

Dimensions : —

Greatest diameter	1.05 inch.
Least diameter	.85 "
Height (proboscis broken off)	.42 "

Geological position and locality. Found in considerable numbers near the top of the silicious mud-beds of the subcarboniferous limestone, Clear Creek, Hardin County, Kentucky.

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August 8, 1860. — STATED MEETING.

The PRESIDENT in the chair.

A quorum for the transaction of business not being present, only scientific communications were in order.

The Corresponding Secretary communicated two papers, entitled as follows: —

"A List of the Phænogamous Species of a Botanical Collection made in the Eastern Part of Cuba by Charles Wright, in the years 1856, 1857, and 1859 - 60, with characters of the New Genera and Species: Part I. The Polypetalæ and Apetalæ, by Professor A. Grisebach, of the University of Göttingen."

"Determinations of the Ferns of the same collection, also of Fendler's Venezuelan Collection, by Daniel C. Eaton, of New York."

Dr. C. T. Jackson read and commented on a letter received